ALLEGATO 2

DESCRIZIONE DELLE TEMATICHE DEL BANDO

TEMATICA
TEMATICA A - Advanced solution for sustainable energy production and management
TEMATICA B - Hardware and software solutions for telemedicine, diagnosis and therapy
TEMATICA C - Data collection and analysis for precision agriculture and water management

TEMATICA A: Advanced solution for sustainable energy production and management

- Ambito di Intervento: ENERGY

- Titolo dell'attività: Direct energy conversion with dyes-based photoelectrochemical cells.

- Obiettivi: Development of photoelectrochemical cells based on dyes for the direct energy conversion.

TEMATICA B: Hardware and software solutions for telemedicine, diagnosis and therapy

-Ambito di Intervento: HEALTH

- TEMATICA B.1:

-Titolo dell'attività Advanced artificial organs (organ-on-chip) development and characterization for produce more personalized models of hepatocarcinoma therapies.

- **Obiettivi:** Organ-on-a-chip technology is ideally suited to cultivate and analyze organoids in vitro. These microphysiological systems have been shown to generate architectures, structural organization, and functions that closely resemble their respective human tissues and organs. Thus, the possibility to use a large number of human organoids derived from individual patients in order to produce more personalized models of hepatocarcinoma therapies urge to be determined. Organoids which are derived from healthy and pathological individuals can be stored and obtained from biobanks where collections of human biomaterials for medical scientific research purpose are available.

- TEMATICA B.2:

- Titolo dell'attività: Evaluation of hepatocarcinoma organ-on-chip biological information to support diagnosis and prognosis

- **Obiettivi:** A clear issue in the Tumor on chip (ToC) application is the extraction and interpretation of the rich biological information. To overcome this limitation, is requested:

(1) the development of a novel video analysis algorithm (Machine Learning and Pattern Recognition) that automatically measure the cytotoxic effects on human cancer cells

(2) the use of genomics, transcriptomics, proteomics, and metabolomics along with the integration of data from these different omics technologies and the use of bioinformatics tools and statistical methods to correlate all the datasets will help in providing a comprehensive view of the tumor biology, offering insights into gene expression, protein interactions, and metabolic pathways, facilitating the discovery of novel biomarkers and therapeutic targets, thus refining and extend the purpose of Task 3.2 (Advanced BioChip Design, Development and Characterization).

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TEMATICA C: Data collection and analysis for precision agriculture and water management

- Ambito di Intervento: AGRICULTURE

- Titolo dell'attività: New digitalization perspectives in the field of smart agriculture aimed to on-site monitoring and refining the correlation between plant health and environmental contamination.

- Obiettivi: The sensors and systems, developed and validated in task 5.1 (Monitoring of contaminants in irrigation water by electrochemical sensors) and 5.2 (AI powered CPS for plant health detection) for the monitoring of pollutants in water environment and plant health detection, need to be assembled in an organized sensing systems using innovative approaches able to monitor in situ the relationship between plant health and environmental contamination. Activities addressed to optimize, by on field validation tests, new engineered systems in correlation between plant health and environmental contamination are required. New digitization perspectives will support the optimal device definition and its performance evaluation.